Psychology of Popular Media

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Online First Publication, March 14, 2022. http://dx.doi.org/10.1037/ppm0000397

AMERICAN PSYCHOLOGICAL ASSOCIATION

Psychology of Popular Media

ISSN: 2689-6567

https://doi.org/10.1037/ppm0000397

BRIEF REPORT

Problematic Video Gaming Is Associated With Poor Sleep Quality, Diet Quality, and Personal Hygiene

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Problematic gamers may focus on game-play so much that they forego regular daily activities in favor of more game time, leading to health impairments. Because problematic gamers often desire to return to the game as quickly as possible, they are known to make myopic choices that favor short-term benefits at the cost of long-term gains. The present research examines certain health behaviors that are likely to suffer from such myopic decision-making: sleep quality, diet quality, and personal hygiene. Although other research has assessed the relationships between gaming behavior and each of these health behaviors separately, they are likely to be intercorrelated—representing a pattern of unhealthy decision-making. To achieve our research goal of understanding how problematic gaming might be associated with these health behaviors, we surveyed a university-based sample (n = 354), including targeted sampling of high-intensity gamers. We assessed problematic gaming's relationship with poorer sleep quality, diet quality, and personal hygiene behaviors. Our results reveal a significant association between problematic gaming and all 3 negative health behaviors. Negative health behaviors associated with problematic gaming may be a potential sign that there is a behavioral addiction issue. Interventions should consider a pattern of such behaviors along with gaming behavior to encourage healthier behavioral choices and game-play.

Public Policy Relevance Statement

Problematic gaming occurs when gaming activities cause distress or impede other activities of life, including healthy habits. Our study reveals relationships between problematic gaming and poorer sleep quality, diet quality, and personal hygiene.

Keywords: video games, problematic gaming, sleep, hygiene, diet

Supplemental materials: https://doi.org/10.1037/ppm0000397.supp

Over 200 million people in the United States play video games (EEDAR, 2018), for an average of 12 hr a week. For around 3% of the population, this game-play develops into a problematic behavior with characteristics that are similar to substance use disorders, such as withdrawal, tolerance, and disruption of other activities (Griffiths, 2015). Problematic gamers may focus on game-play so much that they neglect their nongaming lives, leading to social and health impairments (Griffiths et al., 2017). Of note, different terms have been used to categorize and describe problematic gaming, such as "gaming disorder" and "gaming addiction." The World Health Organization (WHO) added gaming disorder to the *International Classification of Diseases, 11th Revision* (*ICD-11*; World Health Organization, 2021), although it has been hotly debated whether this behavior should qualify as an official disorder or if it is simply a subclinical problematic behavior pattern (Griffiths et al., 2017). The *ICD-11* defines gaming disorder as a combination of impaired control over gaming, increasing priority given to gaming to the extent that gaming takes precedence over other life interests and activities, and continuation or escalation of gaming despite negative consequences. For gaming disorder to be diagnosed, the behavior pattern must be of sufficient severity to result in significant impairment in

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personal, family, social, educational, occupational, or other important areas of functioning and would normally have been evident for at least 12 months. To classify as problematic gaming, a person must meet only some, but not necessarily all, criteria (Griffiths, 2019). Problematic gamers tend to maximize game time, resulting in myopic decision-making—foregoing long-term benefits in exchange for short-term pleasures (Pawlikowski & Brand, 2011). The present research examines the relationship between problematic gaming and three health contexts affected by myopic decision-making: sleep quality, diet quality, and personal hygiene. Although other research has assessed the relationships between gaming behavior and each of these health contexts separately, they are likely intercorrelated—representing a pattern of unhealthy decision-making. It should be noted that although much discussion of problematic gaming has been with regard to clinical definitions restricted to a small subset of the population, measures can identify problematic use that does not necessarily meet the threshold for a mental health diagnosis—but that is nonetheless concerning (van Holst et al., 2012). This continuous conceptualization, rather than a clinical diagnosis, is used in the present study, the purpose of which is to better understand how problematic gaming is associated with three interrelated health behaviors—sleep, diet, and hygiene.

Sleep Quality

Poor sleep quality, defined as short sleep, difficulty falling asleep, and/or sleep disturbances, is associated with fatigue (Exelmans & Van den Bulck, 2015), emotional issues, and depression (Lam, 2014), and it can lead to broader social issues such as negative outcomes at work and school (Hafner et al., 2017). Previous research has found that excessive gaming is associated with later bedtimes and later wake-times (Excelmans & Van den Bulck, 2015). Gaming has also been found to lead to sleep disruptions in adolescents, with greater effects resulting from game-play that occurs closer to bedtime (Wolfe et al., 2014). Overall, the link between gaming behavior and sleep quality has been well established, whether looking at time spent gaming (Männikkö et al., 2015) or gaming before bed (Wolfe et al., 2014). Sleep has also been demonstrated as one victim of myopic decision-making, where people seeking to maximize the short term are more likely to forego sleep in favor of other activities (Massar & Chee, 2019).

Hypothesis 1: An increase in problematic gaming will be associated with poorer sleep quality.

Diet Quality and Obesity

Obesity is a growing epidemic in the United States (Ogden et al., 2017) that can lead to health issues such as cardiovascular disease (Opio et al., 2020). Poor diet quality, defined as poor moderation of caloric consumption, especially calories from added sugars, solid fats, and alcohol, is associated with overweight and obesity (Ruiz et al., 2019). Increased video game playing has been positively correlated with caloric intake, mostly attributed to gamers choosing easily available high-density food (e.g., chips, pizza) to minimize game interruptions (Cronin & McCarthy, 2011). In addition to food, gamers have been found to consume more sugary drinks, which have been implicated in obesity (Malik et al., 2013). Notably, although certain games have moved away from the sedentary game-play to a more active system (e.g., Wii Fit), the amount of energy expended in most game-play sessions is still insufficient to offset the increased caloric intake (Graves et al., 2007). Poor dietary choices have also been associated with myopic decision-making that preferences short-term over long-term goals (Barlow et al., 2016). The present study includes unhealthy dietary behaviors as another potential health outcome associated with problematic gaming.

Hypothesis 2: An increase in problematic gaming will be associated with poorer diet quality.

Personal Hygiene

Poor hygiene is often a symptom of self-neglect that creates problems for the self as well as the public (Poythress et al., 2006). Research on self-neglect has been predominantly conducted with the elderly (Choi et al., 2009). Very little research has been done specifically about gaming and hygiene behaviors, despite the fact that pop culture often mentions poor hygiene as an outcome of excessive gaming (e.g., Bridge, 2014). There has also been a dearth of research on hygiene as a myopic decision-making context. However, we expect to find support for the lay assumption that personal hygiene suffers as gaming behavior becomes more problematic.

Hypothesis 3: An increase in problematic gaming will be associated with poorer personal hygiene.

Method

Participants

Participants were 354 adults (median age = 21 years), of whom 204 (57.63%) identified as male, 144 (40.68%) identified as female, and six (1.69%) provided another identity or refused to answer. Racial and ethnic identities reported included 238 (67.23%) White, 74 (20.90%) Asian, 24 (6.78%) Black or African American, six (1.69%) Hispanic or Latino, five (1.41%) other, three (0.85%) multiracial, three (0.85%) prefer not to answer, and one (0.28%) Native American. The majority (n = 314) signed up to participate for course credit as part of a student participant pool at Michigan State University. A second, simultaneous sample of high-intensity gamers was recruited from the university eSports Student Association (n = 40) to increase variability in problematic gaming behavior. These participants were recruited via email to the eSports listserv and incentivized using a raffle drawing for four $25 Amazon gift cards. Sample source was included as a covariate in analyses. An additional seven participants filled out the survey but were not included in the analysis due to missing data for their body mass index (BMI; see the following text for detail). To note, our sample consisted of undergraduate college students because of the high prevalence of both gaming and gaming disorder in this age-group (Statista, 2021; Wittek et al., 2016). Therefore, understanding problematic gaming in this particular demographic is important. Data were collected with an online Qualtrics survey. Study procedures were approved by the institutional

review board of the university. All participants provided informed consent.

Measures

Problematic Gaming

Problematic gaming was measured by modifying the six-item Problematic Series Watching Scale (English version; Orosz et al., 2016). In each item, we replaced "series watching" with "video game playing" and provided the prompt "By video game playing we mean all kinds of game content that can be played on any device, including but not limited to TV, computer, tablet, or smartphone. Answer each of the 6 questions by selecting one response that best describes you (scale ranging from 1 "never" to 5 "always"). During the last year, how often have you …" (M = 2.18, SD = .80, Cronbach's α = .84).

Sleep Quality

The Pittsburgh Sleep Quality Index (PSQI), which is composed of 19 items, was used to assess participants' sleep quality over the past month (Buysse et al., 1989). This index includes seven components (sleep duration, sleep quality, sleep efficiency, sleep latency, sleep disturbances, daytime dysfunction, and use of sleep medication) ranging between 0 and 3, with higher scores indicating more problems in that particular component. An overall sleep quality score is calculated by summing the component scores (M = 6.04, SD = 2.65).

Diet Quality

The Three-Factor Eating Questionnaire-R18 (Karlsson et al., 2000) assesses three different factors of eating behavior associated with obesity (cognitive restraint, uncontrolled eating, and emotional eating) with 18 items on a 4-point response scale ranging from 1 (*definitely false*) to 4 (*definitely true*). Responses to the questions assessing each eating behavior are averaged to create scale scores for all three factors. Higher scores in each scale indicate greater cognitive restraint (M = 2.47, SD = .74, Cronbach's α = .77), uncontrolled eating (M = 2.05, SD = −.59, Cronbach's α = .86), or emotional eating (M = 1.93, SD = .78, Cronbach's α = .84).

Body Mass Index

BMI was calculated using the standard formula of kg/m^2 (M = 23.70, SD = 4.59). Participants were asked to enter their weight in pounds and their height in feet and inches. Data from four participants were lost due to errors in their height entry, and two participants were removed for implausibly small BMIs (under 10.0).

Hygiene

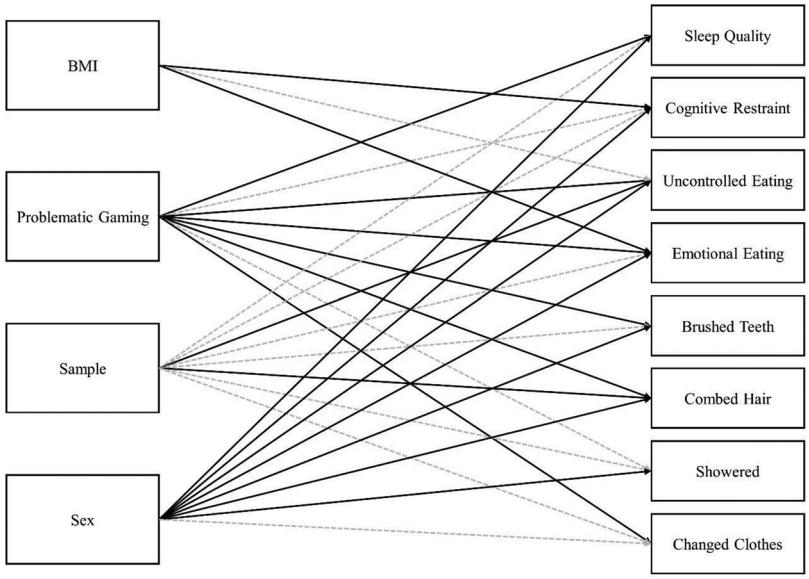
Participants were asked to indicate in the past week how many days (0–7 days) they brushed their teeth (M = 6.68, SD = .92), combed their hair (M = 5.08, SD = 2.64), showered (M = 5.92, SD = 1.39), and changed their clothes (M = 6.64, SD = .94). The items were all correlated at least $p < .01$ but not to the point where they would be redundant (brushed teeth and combed hair r = .25, brushed teeth and showered r = .41, brushed teeth and changed clothes r = .48, combed hair and showered r = .16, combed hair and changed clothes r = .22, showered and changed clothes r =

Table 1
Structural Equation Model Path Analysis Results

Variables	PSQI		Cognitive restraint		Uncontrolled eating		Emotional eating		Brush teeth		Comb hair		Shower		Change clothes	
	b	95% CI	b	95% CI	b	95% CI	b	95% CI	b	95% CI	b	95% CI	b	95% CI	b	95% CI
Problem gaming	0.73***	[0.41, 1.05]	0.08	[−0.02, 0.18]	0.19***	[0.11, 0.27]	0.29***	[0.19, 0.40]	−0.14*	[−0.29, −0.04]	−0.35*	[−0.68, −0.03]	−0.05	[−0.23, 0.13]	−0.13*	[−0.26, −0.01]
Sample	0.32	[−0.56, 1.20]	0.07	[−0.20, 0.34]	−0.24*	[−0.45, −0.04]	0.01	[−0.24, 0.27]	0.23	[−0.03, 0.49]	−0.87	[−1.95, 0.20]	−0.28	[−0.78, 0.23]	−0.13	[−0.51, 0.25]
BMI	—	—	0.03*	[0.01, 0.04]	0.01	[−0.00, 0.02]	0.03**	[0.01, 0.05]	—	—	—	—	—	—	—	—
Sex	0.86**	[0.29, 1.43]	0.45***	[0.29, 0.61]	0.19**	[0.06, 0.32]	0.51***	[0.34, 0.68]	0.24*	[0.05, 0.42]	1.53***	[1.02, 2.04]	−0.73***	[−1.04, −0.43]	0.01	[−0.19, 0.21]
R^2		.07		.10		.10		.18		.04		.12		.07		.02

Note. PSQI = Pittsburgh Sleep Quality Index; BMI = body mass index; CI = confidence interval.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Figure 1
Model Paths



Note. Black solid paths denote significance at $p < .05$, gray dashed paths represent nonsignificance at $p > .05$.

.44). A scale of the average of the four items had poor reliability (Cronbach's $\alpha = .51$), so the items were analyzed as separate measures.

Statistical Analysis

Hypotheses were tested using path analysis in structural equation modeling with maximum likelihood estimation in Stata 14. The three subscales of diet quality were included separately. BMI was included as a covariate predicting all three diet quality measures only. Hygiene was included as four separate variables. Sample source was included as a covariate predicting all endogenous variables (0 = student pool, 1 = eSports association). Sex was also included as a covariate predicting all endogenous variables (0 = male, 1 = female). The error terms of the outcomes were allowed to covary to account for their statistical relationships and to test the model as one of overall unhealthy behavioral patterns. Coefficients reported are unstandardized. The model was multivariate nonnormal according to the Doornik–Hansen omnibus test, $\chi^2(24) = 4948.81$, $p < .001$. Therefore, the Satorra–Bentler adjustment was used; there are no differences in the pattern of results when the adjustment is used versus not used.

Results

Model fit was excellent[1], $\chi^2(5) = 1.00$, $p = .96$, comparative fit index = 1.0, Tucker–Lewis index = 1.0, root mean square error of approximation = .00, standardized root mean squared residual = .01 (Table 1 and Figure 1). Bivariate correlations between all variables in the model can be found in the online supplemental materials. Problematic gaming was significantly associated with worse sleep on the Pittsburgh Sleep Quality Index, worse dietary quality in terms of uncontrolled and emotional eating, and less frequent hygiene behavior in the form of brushing teeth, combing hair, and changing clothes. Problematic gaming was not significantly associated with cognitive restraint for dietary behavior or with showering. These findings support Hypotheses 1, 2, and 3—problematic gaming was associated with reduced healthy behavior across modalities.

Discussion

The present study found that problematic gaming was positively associated with poorer sleep quality, diet quality, and personal hygiene behavior. These results underscore how problematic gaming is associated with a pattern of poor behavioral choices. In light of WHO's inclusion of gaming disorder in the *ICD-11* (World Health Organization, 2021), the results of the present analysis reinforce that problematic gaming is indeed associated with worrisome health behaviors such as poor sleep, diet quality, and personal hygiene. These behaviors, particularly poor sleep and diet, can lead to negative health outcomes such as obesity, cardiovascular disease, and type II diabetes, among others (Yin et al., 2017).

Our findings have practical implications for clinicians and individuals with close relationships to gamers. Health-care providers should address potential problematic gaming behaviors with their patients and assess whether gaming behavior is impeding sleep, diet, and/or hygiene. Recognizing that poor choices in sleep, diet, and personal hygiene may be symptoms of larger issues with gaming behavior might be one way to increase the likelihood that

[1] Acceptable model fit is generally considered comparative fit index ≥.95, Tucker–Lewis index ≥.90, and root mean square error of approximation and standardized root mean squared residual ≤.05 (Hu & Bentler, 1999).

people with problematic gaming behaviors or gaming disorder receive timely intervention. Future research should examine whether changes to these activities might be a bellwether for more serious issues.

There are several limitations to this study. First, as a cross-sectional study, causality cannot be established. Previous work in similar contexts that used experimental or longitudinal methods suggest that gaming would be the antecedent of the effects and not vice versa (Bushman & Anderson, 2015). However, there is most likely a dynamic relationship, where increased gaming is associated with worse health outcomes, and worse health outcomes lead to even more problematic gaming behavior—a pattern called the downward spiral model of media effects (Slater et al., 2003). Second, the Problematic Gaming Scale was adapted from a Problematic Series Watching Scale, and although it demonstrated reliability, it has not been validated for use in this way, so interpretation should be made with caution. Finally, efforts were made to recruit both casual gamers and heavy gamers through the use of a general participation pool and targeting recruitment from the university eSports association; however, future research should look beyond a university sample and at heavier gamers more specifically.

In summary, one of the concerns leading to WHO's decision to denote gaming disorder as a research priority was the association between gaming behavior and negative health behaviors. The present study supports this assertion, in that increased problematic gaming was associated with poorer sleep, diet, and personal hygiene. These relationships should be taken into consideration when addressing problematic gaming behavior, in both social and health-care settings, as such health neglect behaviors may serve as a signal of the onset of problematic gaming.

References

Barlow, P., Reeves, A., McKee, M., Galea, G., & Stuckler, D. (2016). Unhealthy diets, obesity and time discounting: A systematic literature review and network analysis. *Obesity Reviews*, *17*(9), 810–819. https://doi.org/10.1111/obr.12431

Bridge, Z. (2014). Male gamers have issues with hygiene according to survey. *Male gamers have issues with hygiene according to survey*. https://n4g.com/news/1444877/male-gamers-have-issues-with-hygiene-according-to-survey

Bushman, B. J., & Anderson, C. A. (2015). Understanding causality in the effects of media violence. *American Behavioral Scientist*, *59*(14), 1807–1821. https://doi.org/10.1177/0002764215596554

Buysse, D. J., Reynolds, C. F., III Monk, T. H., Berman, S. R., & Kupfer, D. J. (1989). The Pittsburgh Sleep Quality Index: A new instrument for psychiatric practice and research. *Psychiatry Research*, *28*(2), 193–213. https://doi.org/10.1016/0165-1781(89)90047-4

Choi, N. G., Kim, J., & Asseff, J. (2009). Self-neglect and neglect of vulnerable older adults: Reexamination of etiology. *Journal of Gerontological Social Work*, *52*(2), 171–187. https://doi.org/10.1080/01634370802609239

Cronin, J. M., & McCarthy, M. B. (2011). Preventing game over. *Journal of Social Marketing*, *1*(2), 133–153. https://doi.org/10.1108/20426761111141887

Eedar. (2018). Gamer segmentation: 2018 syndicated report. https://www.eedar.com/free-reports

Exelmans, L., & Van den Bulck, J. (2015). Sleep quality is negatively related to video gaming volume in adults. *Journal of Sleep Research*, *24*(2), 189–196. https://doi.org/10.1111/jsr.12255

Graves, L., Stratton, G., Ridgers, N. D., & Cable, N. T. (2007). Comparison of energy expenditure in adolescents when playing new generation and sedentary computer games: Cross sectional study. *BMJ*, *335*(7633), 1282–1284. https://doi.org/10.1136/bmj.39415.632951.80

Griffiths, M. D. (2015). Online games, addiction and overuse of. *International Encyclopedia of Digital Communication and Society*, Advance online publications. https://doi.org/10.1002/9781118767771.wbiedcs044

Griffiths, M. D. (2019). The evolution of the 'components model of addiction' and the need for a confirmatory approach in conceptualizing behavioral addictions. *Dusunen Adam The Journal of Psychiatry and Neurological Sciences*, *32*, 179–184.

Griffiths, M. D., Kuss, D. J., Lopez-Fernandez, O., & Pontes, H. M. (2017). Problematic gaming exists and is an example of disordered gaming. *Journal of Behavioral Addictions*, *6*(3), 296–301. https://doi.org/10.1556/2006.6.2017.037

Hafner, M., Stepanek, M., Taylor, J., Troxel, W. M., & van Stolk, C. (2017). Why sleep matters—the economic costs of insufficient sleep: A cross-country comparative analysis. *Rand Health Quarterly*, *6*(4), Article 11.

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, *6*(1), 1–55. https://doi.org/10.1080/10705519909540118

Karlsson, J., Persson, L.-O., Sjöström, L., & Sullivan, M. (2000). Psychometric properties and factor structure of the Three-Factor Eating Questionnaire (TFEQ) in obese men and women. Results from the Swedish Obese Subjects (SOS) study. *International Journal of Obesity*, *24*(12), 1715–1725. https://doi.org/10.1038/sj.ijo.0801442

Lam, L. T. (2014). Internet gaming addiction, problematic use of the internet, and sleep problems: A systematic review. *Current Psychiatry Reports*, *16*(4), Article 444. https://doi.org/10.1007/s11920-014-0444-1

Malik, V. S., Pan, A., Willett, W. C., & Hu, F. B. (2013). Sugar-sweetened beverages and weight gain in children and adults: a systematic review and meta-analysis. *The American Journal of Clinical Nutrition*, *98*(4), 1084–1102. https://doi.org/10.3945/ajcn.113.058362

Männikkö, N., Billieux, J., & Kääriäinen, M. (2015). Problematic digital gaming behavior and its relation to the psychological, social and physical health of Finnish adolescents and young adults. *Journal of Behavioral Addictions*, *4*(4), 281–288. https://doi.org/10.1556/2006.4.2015.040

Massar, S. A. A., & Chee, M. W. L. (2019). Sleep and delay discounting: Is insufficient sleep a cause or a manifestation of short-sighted choice? *Sleep*, *42*(4), zsz005. https://doi.org/10.1093/sleep/zsz005

Ogden, C. L., Fakhouri, T. H., Carroll, M. D., Hales, C. M., Fryar, C. D., Li, X., & Freedman, D. S. (2017). Prevalence of obesity among adults, by household income and education—United States, 2011–2014. *Morbidity and Mortality Weekly Report*, *66*(50), 1369–1373. https://doi.org/10.15585/mmwr.mm6650a1

Opio, J., Croker, E., Odongo, G. S., Attia, J., Wynne, K., & McEvoy, M. (2020). Metabolically healthy overweight/obesity are associated with increased risk of cardiovascular disease in adults, even in the absence of metabolic risk factors: A systematic review and meta-analysis of prospective cohort studies. *Obesity Reviews*, *21*(12), Article e13127. https://doi.org/10.1111/obr.13127

Orosz, G., Bőthe, B., & Tóth-Király, I. (2016). The development of the Problematic Series Watching Scale (PSWS). *Journal of Behavioral Addictions*, *5*(1), 144–150. https://doi.org/10.1556/2006.5.2016.011

Pawlikowski, M., & Brand, M. (2011). Excessive Internet gaming and decision making: Do excessive World of Warcraft players have problems in decision making under risky conditions? *Psychiatry Research*, *188*(3), 428–433. https://doi.org/10.1016/j.psychres.2011.05.017

Poythress, E. L., Burnett, J., Naik, A. D., Pickens, S., & Dyer, C. B. (2006). Severe self-neglect: An epidemiological and historical

perspective. *Journal of Elder Abuse and Neglect*, *18*(4), 5–12. https://doi.org/10.1300/J084v18n04_02

Ruiz, L. D., Zuelch, M. L., Dimitratos, S. M., & Scherr, R. E. (2019). Adolescent obesity: Diet quality, psychosocial health, and cardiometabolic risk factors. *Nutrients*, *12*(1), Article 43. https://doi.org/10.3390/nu12010043

Slater, M. D., Henry, K. L., Swaim, R. C., & Anderson, L. L. (2003). Violent media content and aggressiveness in adolescents: A downward spiral model. *Communication Research*, *30*(6), 713–736. https://doi.org/10.1177/0093650203258281

Statista. (2021). Distribution of video gamers in the United States in 2021, by age group. https://www.statista.com/statistics/189582/age-of-us-video-game-players/

van Holst, R. J., Lemmens, J. S., Valkenburg, P. M., Peter, J., Veltman, D. J., & Goudriaan, A. E. (2012). Attentional bias and disinhibition toward gaming cues are related to problem gaming in male adolescents. *Journal of Adolescent Health*, *50*(6), 541–546. https://doi.org/10.1016/j.jadohealth.2011.07.006

Wittek, C. T., Finserås, T. R., Pallesen, S., Mentzoni, R. A., Hanss, D., Griffiths, M. D., & Molde, H. (2016). Prevalence and predictors of video game addiction: A study based on a national representative sample of gamers. *International Journal of Mental Health and Addiction*, *14*(5), 672–686. https://doi.org/10.1007/s11469-015-9592-8

Wolfe, J., Kar, K., Perry, A., Reynolds, C., Gradisar, M., & Short, M. A. (2014). Single night video-game use leads to sleep loss and attention deficits in older adolescents. *Journal of Adolescence*, *37*(7), 1003–1009. https://doi.org/10.1016/j.adolescence.2014.07.013

World Health Organization. (2021). International Classification of Diseases 11th Revision. https://icd.who.int/en

Yin, J., Jin, X., Shan, Z., Li, S., Huang, H., Li, P., Peng, X., Peng, Z., Yu, K., Bao, W., Yang, W., Chen, X., & Liu, L. (2017). Relationship of sleep duration with all-cause mortality and cardiovascular events: A systematic review and dose-response meta-analysis of prospective cohort studies. *Journal of the American Heart Association*, *6*(9), Article e005947. https://doi.org/10.1161/JAHA.117.005947

Received April 15, 2021
Revision received January 12, 2022
Accepted February 4, 2022 ■